

REMARKS

The Office Action mailed December 27, 2005 has been reviewed and carefully considered. No new matter has been added.

Claims 15, 20, and 21 have been cancelled without prejudice. Claims 1, 14, and 22 have been amended. Claims 1-9, 11-14, 16, 18-19, and 22 are pending.

Claims 14, 15, 21 and 22 stand rejected under 35 U.S.C. §112, first paragraph. As noted above, Claims 15 and 21 have been cancelled. Claim 14 has been amended to now recite "the first signal port" at line 3. Each occurrence of "pin" in Claim 22 has been amended to now recite "PIN". Claims 14 and 22 are believed to satisfy 35 U.S.C. §112, first paragraph. Reconsideration of the rejection is respectfully requested.

Claims 1, 7, 11, 14, and 18 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,308,051 to Atokawa (hereinafter "Atokawa '051") in view of U.S. Patent No. 5,193,218 to Shimo and in further view of U.S. Patent No. 6,724,840 to Osofsky. Moreover, Claims 14, 15, and 19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,414,566 to Atokawa (hereinafter "Atokawa '566") in view of Osofsky. Claims 1, 2, 8, 14, 15, 16, and 20-22 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Atokawa '566 in view of Shimo and in further view of Osofsky. Claims 2, 3, 5, 6, and 12 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,804,262 to Vogel (hereinafter "Vogel") in view of Atokawa, in further view of Shimo, and in further view of Osofsky. Claims 2 and 6 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Vogel in view of Atokawa '566. Claim 9 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Vogel in view of Atokawa '566, in further view of Shimo, in further view of Osofsky, and in further view of U.S. Patent Publication No. 2002/0159511 to Wilson (hereinafter "Wilson"). Claims 4 and 13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Vogel in view of Atokawa, in further view of Shimo, in further view of Osofsky, and in further view of U.S. Patent No. 6,690,655 to Miner et al. (hereinafter "Miner").

As noted above, Claims 15, 20, and 21 have been cancelled.

It is respectfully asserted that none of the cited references, either taken singly or in any combination, teach or suggest "wherein said notch filter comprises only a plurality of inductors and a plurality of PIN diodes, each of the plurality of inductors having a first end and a second end, each of the plurality of inductors connected in parallel with a respective one of the plurality

of PIN diodes at the first end and a common control node at the second end”, as now recited in amended Claim 1.

Moreover, it is respectfully asserted that none of the cited references, either taken singly or in any combination, teach or suggest the following limitations of amended Claim 14:

wherein said low-pass filter comprises a first set of inductors connected in series between said first and third signal ports, each of said first set of inductors being coupled to ground via a respective capacitor from a set of capacitors forming thereby a plurality of single pole filter elements, a portion of said first set of inductors being bypassed by a subset of the set of capacitors, the portion consisting of any of the first set of inductors which are connected to said notch filter via any of the capacitors in the subset of capacitors,

wherein said notch filter comprises a second set of inductors, where each inductor is respectively coupled between a particular one of capacitors in the subset of capacitors and ground, and

wherein a subset of the first set of inductors are directly connected to ground via only the respective capacitor from the set of capacitors, the subset of the first set of inductors consisting of any inductors in the set of inductors that are directly coupled to any capacitors in the set of capacitors that are excluded from the subset of capacitors.

The amendment to Claim 1 is similar to the previous limitations of now cancelled Claim 21, with the further inclusion of the word “only” to further limit the elements of the notch filter to only the plurality of inductors and PIN diodes.

Moreover, the amendment to Claim 14 is similar to the previous limitations of now cancelled Claim 22 (with some minor changes to clarify the same), with the further inclusion of language describing a subset of the first set of inductors being directly connected to ground via only a respective capacitor from the set of capacitors, the subset of the first set of inductors including those inductors connected to capacitors included in the set of capacitors

but excluded from the subset of capacitors, wherein the first set of inductors is part of the low-pass filter and the second set of inductors is part of the notch filter.

It is to be noted that the Examiner has cited Atokawa 566 as disclosing the previous elements of previous Claims 21 and 15 and, thus, Atokawa 566 will be addressed first.

The Examiner has stated the following:

Atokawa-'566 discloses a first plurality of inductors (fig. 2, refs. L2, L1, and L31) connected in series between said fist (fig. 2, ANT) and third signal ports (fig. 2, ref. TX), each of said first plurality of inductors being coupled to ground via a respective capacitor (fig. 2, refs. C21, C11) forming thereby a plurality of single pole elements, a portion of said first plurality of inductors being bypassed by respective capacitors (fig. 2, refs. C20, C10), the portion consisting of any of the first plurality of inductors which are connected to said notch filter (fig. 2, refs. C20, C10, LT2, LT1, D2 and D1) via the respective capacitor; and said notch filter comprises: a second plurality of inductors (fig. 2, refs. LT1, LT2), where each inductor is respectively coupled between a portion of the capacitors of the single pole filter elements of the low-pass filter and ground (fig. 2).

However, Claim 1 now explicitly recites that the "notch filter comprises only a plurality of inductors and a plurality of PIN diodes". In contrast, Atokawa '566 discloses a bandpass elimination filter formed from at least resonators R1 and R2. In relation, the Examiner has designated that Atokawa '056 discloses a low pass filter between the ANT and TX terminals shown in FIG. 2 and a notch filter that includes elements C20, C10, LT2, LT1 also shown in FIG. 2 (Office Action, p. 5). The portion of the circuit shown in FIG. 2 of Atokawa '566 that the Examiner has deemed a notch filter includes and is dependent upon a state of at least resonators R1 and R2. For example, column 4, lines 36-37 and 51-61, and column 5, lines 25-36 of Atokawa '566 disclose

[R]esonant frequencies of the resonators R1 and R2 are individually used as attenuation poles. ... In the transmitting filter, a serial circuit is formed of a diode D1 and a capacitor 10 is formed between the end and the grounded point

of the resonator R1. A serial circuit formed of a diode D2 and a capacitor 20 is formed between the end and the grounded point of the resonator R2. An RF-blocking circuit formed of an inductor LT1, a resistor RT, and a capacitor CT is provided between the control-signal input terminal CONT1 and the diode D1. An RF-blocking circuit formed of an inductor LT2, the resistor RT, and the capacitor CT is provided between the control-signal input terminal CONT1 and the diode D2. ... [I]n response to a predetermined positive voltage applied to the control-signal input terminal CONT1, the diodes D1 and D2 become conductive, and the capacitors 10 and 20 are substantially parallel-connected to the resonators R1 and R2, respectively. Thereby, individual resonant frequencies of the resonators R1 and R2 decrease. When the application voltage to the control-signal input terminal CONT1 is reduced to 0V, the diodes D1 and D2 are blocked. Therefore, the capacitors 10 and 20 are disconnected from the resonators R1 and R2, respectively, thereby increasing the resonant frequencies of the resonators R1 and R2.

Further, with respect to Atokawa '051, the same discloses a frequency variable trap circuit 28 designated by the Examiner as a low-pass circuit (Office Action, p. 4), and a resonant-dependent notch filter designated by the Examiner to include elements D3, L4, R2, and C13 of FIG. 1 of Atokawa '051. However, the notch filter includes and operates dependent upon a state of at least resonator D4. For example, Atokawa '051 discloses that "[t]he frequency variable trap circuit 28 is provided with the resonator 4 which is electrically connected through the capacitor C7 for resonance at the intermediate connection point of the surface acoustic wave filter circuit 30 and the second phase shifter 29. The series circuit of the variable bandwidth capacitor C8 and the PIN diode D3 is electrically connected in parallel to the resonator 4 in a condition where a cathode of the PIN diode D3 is grounded at the intermediate connection point of the resonator 4 to the capacitor C7 for resonance" (Atokawa '051, col. 5, lines 48-57).

Thus, while the notch filter of Claim 1 includes only the plurality of inductors and the plurality of pin diodes, both Atokawa '051 and '566 include and rely upon resonators.

With respect to Claim 14, Atokawa '566 discloses that "Inductors L1 and L31 and a capacitor C3 configure a phase-synthesizer circuit. The phase-synthesizer circuit prevents the intrusion of transmitted signals into the receiving filter. It also prevents the intrusion of received

signals to the transmitting filter. Thus, the phase-synthetic circuit separates signals into transmitting signals and received signals” (Atokawa ‘566, col. 4, lines 45-50). Accordingly, these elements are not part of either the transmitting filter or the receiving filter. However, no inductors from either the receiving or transmitting circuits, which would arguably correspond to high and low pass filters, include the limitations of Claim 14 such as, e.g., “wherein a subset of the first set of inductors are directly connected to ground via only the respective capacitor”.

With further respect to Claim 14, Atokawa ‘051 discloses a phase shifter 29 including L10, L11 and C10. Accordingly, these elements are not part of either the transmitting filter 25 or the receiving filter 26. However, no inductors from either the receiving 26 or transmitting 25 filters, which would arguably correspond to high and low pass filters, include the limitations of Claim 14 such as, e.g., “wherein a subset of the first set of inductors are directly connected to ground via only the respective capacitor”.

Moreover, none of the other references (Shimo, Osofsky, Vogel, Wilson, and Miner) cure the deficiencies of Atokawa ‘061 and/or Atokawa ‘566, either taken singly or in any combination. For example, as admitted by the Examiner, “Vogel does not disclose that the diplexer is having a high-pass filter, a low-pass filter, and a notch filter selectively coupled to the low-pass filter in response to indicium of a desired spectral region” (previous Office Action, dated May 24, 2005, pp. 7-8). Accordingly, none of the cited references, either taken singly or in any combination, teach or suggest the above-recited limitations of Claims 1 and 14.

“To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art” (MPEP §2143.03, citing *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)). Moreover, “[i]f an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious” (MPEP §2143.03, citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)).

Claims 2-9 and 11-13 depend from Claim 1 or a claim which itself is dependent from Claim 1 and, thus, includes all the elements of Claim 1. Accordingly, Claims 2-9 and 11-13 are patentably distinct and non-obvious over the cited reference for at least the reasons set forth above with respect to Claim 1.

Claims 16, 18-19, and 22 depend from Claim 14 or a claim which itself is dependent from Claim 14 and, thus, includes all the elements of Claim 14. Accordingly, Claims 16, 18-19, and 22 are patentably distinct and non-obvious over the cited reference for at least the reasons set forth above with respect to Claim 14.

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Accordingly, reconsideration of the rejections is respectfully requested.

In view of the foregoing, Applicants respectfully request that the rejection of the claims set forth in the Office Action of December 27, 2005 be withdrawn, that pending claims 1-9, 11-14, 16, 18-19, and 22 be allowed, and that the case proceed to early issuance of Letters Patent in due course.

It is believed that no additional fees or charges are currently due. However, in the event that any additional fees or charges are required at this time in connection with the application, they may be charged to applicants' Deposit Account No.07-0832.

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Patent Operations

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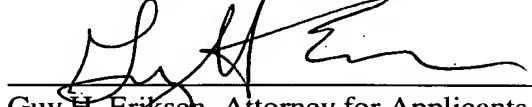
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